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10/749,569	12/30/2003	Ho Sang Sung	1998.1004	8996

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EXAMINER	
WOZNIAK, JAMES S	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/749,569	SUNG ET AL.	
	Examiner	Art Unit	
	James S. Wozniak	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings *(Fig. 1)* must show every feature of the invention specified in the claims *(i.e., "linear prediction coefficient in which a wide-code speech signal to be coded is perceptual weigh filtered")*. Therefore, the connection between the perceptual weighting filter and the linear prediction coefficient analyzer must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings *(Fig. 1)* are objected to under 37 CFR 1.83(a) because they fail to show a connection between the open-circuit pitch retrieving unit and the perceptual weighing filter as described in the specification *(see Page 6, Lines 20-22)*. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: --Wide-band Speech Coder/Decoder and Method Thereof Utilizing Multiple Fixed Codebooks--.

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet *within the range of 50 to 150 words*. It is important that the abstract *not exceed 150 words in length* since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

5. **Claims 1-10** are objected to because of the following informalities:

In claims 1 and 6 *(line 4)*, it appears the speech signal referred to should be a –wide-band-- speech signal not a "wide-code" speech signal *(see specification, input as a wide-band speech signal, Page 6, Lines 11-12)*.

In claims 1 and 6 *(lines 21 and 26; and lines 15-16 and line 19, respectively)*, "indices" should be changed to –index-- because it appears that only one index is generated to express a

second fixed codebook target signal *(see the corresponding decoder in claim 11, lines 16-17, which uses a single second fixed codebook index and specification, "second fixed codebook index", Page 7, Lines 22-24).*

In claims 5 and 10 *(line 3)*, "the ratio" should be changed to –a ratio-- in order to provide proper antecedent basis for this limitation in the claims.

In claims 11 and 12, (line 6), "indices" should be changed to –index-- because it appears that only one index is generated to express a second fixed codebook target signal *(see the specification, "second fixed codebook index", Page 7, Lines 22-24).*

In claim 12, line 20, "processed" should be changed to –processing--.

Dependent claims 2-5 and 7-10 fail to overcome the objections directed towards their corresponding parent claims, and thus, are also objected to due to minor informalities.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. **Claims 11-12** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 11-12, the phrase "such as" *(line 3)* renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 1, 4, 6, 9, and 11-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao *(U.S. Patent: 6,449,590)* in view of Ozawa *(U.S. Patent: 5,487,128)* and further in view of Laflamme et al *("16 Kbps Wideband Speech Coding Technique Based on Algebraic CELP," 1991)*.

With respect to **Claim 1**, Gao discloses:

A speech characteristic classification unit, which stipulates a characteristic of speech corresponding to a current frame statistically using an open-circuit pitch value and a linear prediction coefficient in which a speech signal to be coded is perceptual weigh filtered (*voiced/unvoiced classification unit, Col. 12, Lines 14-20; Fig. 2, Element 279, utilizing a perceptually weighted input speech signal having an open loop pitch value and linear prediction (LP) parameters, wherein different classes are represented by different subcodebooks, Col. 8, Line 63- Col. 9, Line 6; Col. 13, Lines 8-29; Fig. 2, Elements 219, 239, and 241)*;

An adaptive codebook retrieving unit, which retrieves a pitch delay value around the open-circuit pitch value, calculates a pitch gain value, generates an adaptive codebook contribution signal corresponding to the retrieved pitch delay value, and outputs a difference between the generated adaptive codebook contribution signal and the perceptual weigh filtered

signal as a first fixed codebook target signal *(adaptive codebook search around an open loop pitch lag to generate a pitch delay, gain value, and an adaptive codebook contribution, Col. 9, Lines 16-33; Col. 21, Lines 52-59; Col. 22, Lines 34-54; Fig. 2, Element 257; and a fixed codebook target signal as a difference between a perceptually weighted speech signal and an adaptive codebook contribution, Col. 9, Lines 28-33; Fig. 2, Element 253)*;

A fixed codebook retrieving unit, which includes at least two second fixed codebooks according to a speech characteristic *(fixed codebook comprising a plurality of fixed subcodebooks, Fig. 2, Element 261)*, selects a second fixed codebook according to the speech characteristic *(subcodebook selection based on speech classification, Col. 6, Lines 27-39; and Fig. 2, Elements 261, 275, 279)*, and retrieves second fixed codebook indices that can express the fixed codebook target signal most properly (fixed codebook search based on a generated target signal *(Col. 9, Lines 28-33)*, and fixed codebook gain values *(fixed codebook gain, Col. 9, Lines 34-40; Col. 36, Line 45- Col. 37, Line 35; and Fig. 2, Element 263)*;

A parameter multiplexer, which quantizes and multiplexes the speech characteristic information, the pitch delay value, the pitch gain value, the first fixed codebook index, the fixed codebook indices, and the fixed codebook gain values, makes them as a bit stream, and transmits the bit stream to an external speech decoding terminal *(quantizing and multiplexing all generated speech parameters into a bit stream at a multiplexer, Col. 6, Line 57- Col. 7, Line 11; Col. 41, Lines 15-17; and Fig. 4, Element 419; and decoder, Fig. 5)*.

Although Gao discloses a speech encoder comprising an adaptive codebook and a second fixed codebook having multiple subcodebooks, Gao does not teach two fixed codebook units, specifically a first codebook unit that outputs a difference between a codebook contribution

output and a searching input to the first codebook. Ozawa, however, discloses a cascaded codebook structure wherein a first codebook produces a first codebook contribution and an error signal representing the difference between a codebook search target input and a codebook contribution candidate *(Fig. 2, Elements 200, 210, and 220; and Col. 7, Lines 11-39)* and a second codebook produces a second codebook contribution based on the error generated using the first codebook *(Fig. 2, Elements 230 and 240)*. Ozawa further teaches a first codebook structure comprising a single codebook and a second codebook structure comprising multiple subcodebooks *(Fig. 2)* and mentions generating gain to be associated with a codebook contribution (*Col. 1, Lines 37-40)*.

Gao and Ozawa are analogous art because they are from a similar field of endeavor in speech signal encoding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Gao with the cascaded codebook structure taught by Ozawa in order to implement a speech coding scheme that reduces memory necessary for codebook storage and is high in performance *(Ozawa, Col. 2, Line 65- Col. 3, Line 5)*.

Although the combination of Gao and Ozawa discloses all of the features of the claimed invention and Gao further discloses CELP coding *(Col. 8, Lines 5-7)*, Gao and Ozawa do not specifically mention wideband speech signal encoding. Laflamme, however, recites the ability to encode wideband speech using a CELP coding scheme *(Section 1, Page 13)*.

Gao, Ozawa, and Laflamme are analogous art because they are from a similar field of endeavor in speech signal encoding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Gao in view of Ozawa with

the concept of wideband speech encoding taught by Laflamme in order to encode a higher quality speech signal *(Laflamme, Section 1, Page 13)*.

With respect to **Claim 4**, Gao further discloses:

The second fixed codebook gain values include all gain values of each of the second fixed codebooks *(second fixed codebook gain that is calculated for all fixed subcodebooks, Col. 36, Line 45- Col. 37, Line 35)*.

Claim 6 recites the corresponding method performed by the system described in claim 1, and, thus is rejected under similar rationale.

Claim 9 contains subject matter similar to Claim 4, and thus, is rejected for the same reasons.

With respect to **Claim 11**, Gao discloses:

A parameter demultiplexer, which demultiplexes a bit stream transmitted from an external speech coder *(demultiplexer, Fig. 5, Element 513, that demultiplexes a bit stream from a remote speech encoder, Col. 7, Lines 18-27)*, including parameters, such as speech characteristic information, an adaptive codebook pitch delay value, an adaptive codebook pitch gain value, fixed codebook indices, and second fixed codebook gain values and restores the parameters *(transmitted speech parameters that form a bitstream generated by an encoder (Col. 6, Line 57- Col. 7, Line 10) and are received by a decoder including: a fixed codevector representative of a fixed subcodebook corresponding to different speech characteristics, Col. 6, Lines 27-39; an adaptive codebook pitch delay, gain value, and an adaptive codebook contribution, Col. 9, Lines 16-33; Col. 21, Lines 52-59; Col. 22, Lines 34-54; Fig. 2, Element 257; fixed codebook*

innovations, Col. 9, Lines 28-33; and fixed codebook gains, Col. 9, Lines 34-40; Col. 36, Line 45- Col. 37, Line 35; and Fig. 2, Element 263);

An adaptive code vector generator, which obtains an adaptive code vector corresponding to the adaptive codebook pitch delay value and the adaptive codebook pitch gain value *(adaptive codebook generator that generates an adaptive codevector based on the pitch delay index generated at an encoder, Col. 7, Lines 28-43; and Fig. 5, Element 515)*;

A second fixed code vector generator, which selects a second fixed codebook from a plurality of second fixed codebooks using the speech characteristic information *(decoder comprising a fixed codebook, wherein the fixed codebook contains indexes corresponding to a fixed codebook utilized at a decoder having multiple fixed subcodebooks corresponding to a speech characteristic, Fig. 5, Element 519; Fig. 2, Element 261; Col. 6, Lines 27-39; and selecting fixed codevectors based on an indices corresponding to the different subcodebooks, thus effectively selecting the subcodebooks, Col. 7, Lines 28-43)*, obtains a fixed code vector corresponding to the second fixed codebook index and the second fixed codebook gain value *(fixed codevector and associated gain, Col. 7, Lines 28-43)*;

An adder, which adds the adaptive code vector and the first and second fixed code vectors to one another and generates an excitation signal *(adder (unlabeled) in Fig. 5; and generated excitation signal, Col. 7, Lines 28-43)*, and wherein the excitation signal is linear prediction synthesis filter processed and post-processing filter processed and is generated as a speech synthesis signal *(LP synthesis filter processing and post filtering, Col. 10, Lines 9-21; and Fig. 5, Elements 531 and 535)*.

Although Gao discloses a speech decoder comprising an adaptive codebook and a second fixed codebook having multiple subcodebooks, Gao does not teach two fixed codebook units, specifically a first codebook unit that outputs a first decodable codevector. Ozawa, however, discloses a cascaded codebook structure wherein a first codebook produces a first codebook contribution and an error signal representing the difference between a codebook search target input and a codebook contribution candidate *(Fig. 2, Elements 200, 210, and 220; and Col. 7, Lines 11-39)* and a second codebook produces a second codebook contribution based on the error generated using the first codebook *(Fig. 2, Elements 230 and 240)*. Ozawa further teaches a first codebook structure comprising a single codebook and a second codebook structure comprising multiple subcodebooks *(Fig. 2)* and mentions generating gain to be associated with a codebook contribution (*Col. 1, Lines 37-40)*.

Gao and Ozawa are analogous art because they are from a similar field of endeavor in speech signal encoding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Gao with the cascaded codebook structure taught by Ozawa in order to implement a speech coding scheme that reduces memory necessary for codebook storage and is high in performance *(Ozawa, Col. 2, Line 65- Col. 3, Line 5)*.

Although the combination of Gao and Ozawa discloses all of the features of the claimed invention and Gao further discloses CELP coding/decoding *(Col. 8, Lines 5-7)*, Gao and Ozawa do not specifically mention wideband speech signal processing. Laflamme, however, recites the ability to encode wideband speech using a CELP coding scheme *(Section 1, Page 13)*.

Gao, Ozawa, and Laflamme are analogous art because they are from a similar field of endeavor in speech signal encoding. Thus, it would have been obvious to a person of ordinary

skill in the art, at the time of invention, to modify the teachings of Gao in view of Ozawa with the concept of wideband speech encoding taught by Laflamme in order to encode a higher quality speech signal *(Laflamme, Section 1, Page 13)*.

Claim 12 recites the corresponding method performed by the system described in claim 11, and, thus is rejected under similar rationale.

9. **Claims 2-3 and 7-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao in view of Ozawa further in view of Laflamme et al and yet further in view of Chhatwal et al *(U.S. Patent: 5,457,783)*.

With respect to **Claim 2**, Gao in view of Ozawa and further in view of Laflamme discloses the speech encoder having an adaptive codebook and cascaded fixed codebooks, as applied to Claim 1. Although Gao discloses selecting different types of codebooks for voiced/unvoiced speech *(subcodebook selection based on speech classification, Col. 6, Lines 27-39; and Fig. 2, Elements 261, 275, 279)*, Gao in view of Ozawa and further in view of Laflamme does not specifically suggest the use of a random codebook for fricatives and an algebraic codebook for other speech sections, however Chhatwal discloses the use of an algebraic codevector codebook for voiced speech sections *(Col. 9, Line 65- Col. 10, Line 55)* and the use of a random codebook for unvoiced fricatives *(Col. 13, Lines 38-67; and Col. 15, Lines 1-30)*.

Gao, Ozawa, Laflamme, and Chhatwal are analogous art because they are from a similar field of endeavor in speech signal encoding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Gao in view of Ozawa and further in view of Laflamme with the specific codebooks taught by Chhatwal in order

to provide a codebook capable of effectively modeling unvoiced signal classes *(Chhatwal, Col. 13, Lines 38-67)*.

With respect to **Claim 3**, Chhatwal discloses the random codebook used for unvoiced fricatives and the algebraic codebook used for voiced speech, as applied to Claim 2.

Claims 7-8 contain subject matter respectively similar to claims 2-3, and thus, are rejected for the same reasons.

10. **Claims 5 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao in view of Ozawa further in view of Laflamme et al and yet further in view of Westerlund et al *(U.S. Patent: 6,757,654)*.

With respect to **Claim 5**, Gao in view of Ozawa and further in view of Laflamme discloses the speech encoder having an adaptive codebook and cascaded fixed codebooks, as applied to Claim 1. Although Gao discloses multiple fixed codebooks having associated gains *(Fig. 2, Elements 261 and 263)*, Gao in view of Ozawa and further in view of Laflamme does not specifically suggest encoding a second standardized fixed codebook gain and using that standardized gain in a ratio with other fixed codebook gain values. Westerlund, however, discloses such a ratio between standardized fixed codebook values and other codebook gains *(ratio or distribution comprising a long-term prediction gain and algebraic codebook gain, Col. 21, Lines 30-45)*.

Gao, Ozawa, Laflamme, and Westerlund are analogous art because they are from a similar field of endeavor in speech signal encoding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Gao in

view of Ozawa and further in view of Laflamme with the ratio calculation taught by Westerlund in order to provide a predictor for algebraic codebook gain *(Westerlund, Col. 21, Lines 30-31)*.

Claim 10 contains subject matter similar to Claim 5, and thus, is rejected for the same reasons.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Amada et al *(U.S. Patent: 5,677,986)*- discloses a speech coder utilizing a combination of two stochastic codebooks.

Aoyagi et al *(U.S. Patent: 5,752,223)*- discloses a CELP coder having the ability to select between a stochastic and pulse codebook.

Mermelstein *(U.S. Patent: 6,249,758)*- discloses a speech coder having two stochastic codebooks.

Su *(U.S. Patent: 6,330,531)*- discloses a speech coder having multiple fixed subcodebooks.

Tasaki *(U.S. Patent: 6,408,268)*- discloses a speech encoder that sums the contributions of two stochastic codebooks.

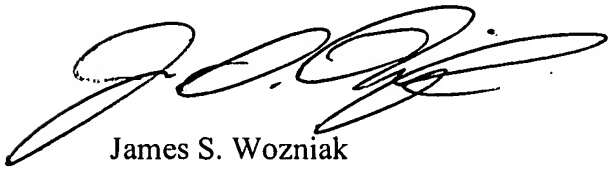
Bessette et al *(U.S. Patent: 6,795,805)*- discloses a wide-band speech encoder.

Jung et al *("A Cascaded Algebraic Codebook Structure to Improve the Performance of Speech Coder," 2003)*- discloses a speech encoder employing a cascaded fixed codebook structure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached at (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James S. Wozniak
9/10/2007